DESCRIPTION

JOINT EQUIPMENT FOR STEEL REINFORCING

Technical Field

The present invention relates, in general, to reinforcing bar couplers and, more particularly, to a reinforcing bar coupler which is intended to easily couple reinforcing bars to be embedded in concrete for increasing its tensile force in reinforced concrete work, thus reducing a construction period and construction costs.

Background Art

Generally, reinforced concrete is concrete containing reinforcing bars, with the concrete bearing compressive force and the reinforcing bars bearing tensile force.

The reinforced concrete is obtained through the following process. First, reinforcing bars are arranged in a mold fabricated from molding panels, and concrete is poured into the mold to be integrated with the reinforcing bars into a single structure. In this case, as necessary, several reinforcing bars produced at certain unit lengths from factories are coupled to each other. Thus, joints are formed between the coupled reinforcing bars. During a concrete curing process, a certain tensile force acts on the joints between the coupled reinforcing bars. In order

to sufficiently withstand the tensile force acting on the joints, the coupling of the reinforcing bars must be firmly maintained.

Accordingly, there have been used various methods of firmly coupling the reinforcing bars, for example, a lap-joint process, a pressure welding process, etc.

The lap-joint process is carried out in such a way that ends of reinforcing bars are overlapped at certain lengths thereof and the overlapping ends of the reinforcing bars are bound with binding wires. The lap-joint process is advantageous in that the bar arranging work is easy. However, when the reinforcing bars have large diameters, centers of the coupled reinforcing bars are different from each other, so that stress is differently concentrated on the reinforcing bars, thus weakening the strength of a structure. Particularly, in the case of thin reinforced concrete, the lapped reinforcing bars reduce an empty space of the mold, so that it is difficult to pour concrete into the mold. Further, it is difficult to arrange the reinforcing bars at a predetermined interval or maintain a desired minimum concrete thickness.

Meanwhile, the pressure welding process is carried out as follows. That is, ends of reinforcing bars are butted on each other, and the ends of the reinforcing bars are heated and compressed to be integrated into a single structure. The pressure welding process has problems in

that a working period is long, and costs are excessive, and besides, there exists a possibility of a fire, so that it is difficult to utilize the pressure welding process for coupling the reinforcing bars.

In order to solve the problems occurring in the lap-joint process and the pressure welding process, a mechanical coupling method has been used to couple reinforcing bars to each other.

There have been proposed various types of couplers to mechanically couple reinforcing bars to each other. However, the conventional reinforcing bar couplers are problematic in that many components are combined with each other through complicated assembly to couple the reinforcing bars to each other.

FIG. 4 is an exploded perspective view of a conventional reinforcing bar coupler, and FIG. 5 is a sectional view to show reinforcing bars coupled by the coupler of FIG. 4. FIG. 4 shows a conventional mechanical coupling method. First, ends of two reinforcing bars are butted on each other, and the ends of the reinforcing bars 50 are covered with a cover unit 60 which is divided into two parts. Next, locking bushings 70 each having on an inner surface thereof a threaded part are fitted over both ends of the cover unit 60. In this way, the reinforcing bars 50 are mechanically coupled to each other. This method provides a high coupling force, but is inconvenient to

execute the coupling operation. In a detailed description, when the reinforcing bars are coupled to each other in a vertical direction, the upper and lower locking bushings must be rotated so that the threaded parts of the locking bushings engage with both ends of the cover unit, thus a process time undesirably increases. In order to prevent the working time from increasing due to the engagement of the threaded parts, another coupling method has been proposed. According to this coupling method, the ends of two reinforcing bars are butted on each other, and the ends of the reinforcing bars are covered with a cover unit which is divided into two parts. Next, locking bushings are fitted over both ends of the cover unit through a drive fitting method. Such a method can reduce the time required for the engagement of the threaded parts, but has difficulty in driving the locking bushings. That is, the upper locking bushing is easily fitted over an end of the cover unit, because a worker has only to drive the upper locking bushing downwards. However, it is difficult to drive the lower locking bushing upwards.

Since the lap-joint process or the pressure welding process is more advantageous than the mechanical coupling method in many respects, for example, working costs, a working period, ease in work, etc., the lap-joint process or the pressure welding process has still been widely used in many work places.

Description of Drawings

FIG. 1 is an exploded perspective view of a reinforcing bar coupler, according to an embodiment of the present invention;

FIG. 2 is a sectional view to show reinforcing bars coupled by the reinforcing bar coupler of FIG. 1;

FIG. 3 is a perspective view to show specified parts of a reinforcing bar coupler, according to another embodiment of the present invention;

FIG. 4 is an exploded perspective view of a conventional reinforcing bar coupler; and

FIG. 5 is a sectional view to show reinforcing bars coupled by the coupler of FIG. 4.

Disclosure

Technical Problem

An object of the present invention is to provide a reinforcing bar coupler which is constructed so that a small number of components are combined with each other through simple assembly to firmly couple reinforcing bars to each other, thus reducing a working time, and allowing a bar coupling operation to be easily performed. The present invention provides a reinforcing bar coupler to couple reinforcing bars to each other through a one-way drive

fitting method. That is, the ends of two reinforcing bars are butted on each other, and the ends are covered with a covering unit which is divided into two or more pieces. Subsequently, the reinforcing bars are coupled to each other by driving locking bushings on an end of the cover unit through the one-way drive fitting method. Such a method reduces a loss of time required for the engagement of threaded parts. Further, a worker has only to drive the locking bushings in one direction, thus making the coupling operation convenient.

Technical Solution

In order to accomplish the above object, the present invention provides a reinforcing bar coupler, including a cover unit to cover reinforcing bars, and a locking bushing fitted over the cover unit to firmly couple the cover unit to the reinforcing bars. The cover unit has a circular hole therein to receive the reinforcing bars in the hole, and includes two or more pieces to cover the reinforcing bars. In this case, outer surfaces of the pieces are inclined in the same direction to form a tapered surface, and annular grooves are provided on an inner surface of each of the pieces so that annular ribs of the reinforcing bars are seated in the annular grooves. The locking bushing comprises at least one locking bushing, and has on an inner surface thereof a tapered surface to correspond to the

tapered surface of the cover unit. The locking bushing is fitted over the cover unit to compress the cover unit inwards. The annular grooves are provided on the inner surfaces of two or more pieces that are joined together to form a circular hole, thus surrounding the reinforcing bars, and the annular ribs of the reinforcing bars are seated in the annular grooves.

The cover unit may comprise a pair of pieces each having a semi-circular cross-section, with outer surfaces of the pieces being inclined in the same direction to form a tapered surface. Further, the locking bushing, which is fitted over the cover unit to compress the cover unit toward the reinforcing bars, has a shape of a pipe with a circular cross-section, with an inner surface of the pipe formed to correspond to the tapered surface of the cover unit.

Further, the cover unit may include lateral grooves provided on the inner surface of the cover unit in a lengthwise direction thereof so that lateral ribs of the reinforcing bars are seated in the lateral grooves.

Advantageous Effects

The present invention provides a reinforcing bar coupler, which allows reinforcing bars arranged in reinforced concreted work to be coupled to each other through simple operation, and affords sufficient strength

to the coupled portion of the reinforcing bars, thus shortening a period for bar arranging work and a period for the reinforced concrete work.

Compared to conventional mechanical coupling methods, for example, a thread engaging method, the present invention is capable of shortening a working period, because it is unnecessary to rotate locking bushings. Further, according to the present invention, a worker has only to drive all locking bushings in one direction, so that the bar coupling operation is very easy.

Best Mode

The preferred embodiments of the present invention will be described below in detail with reference to the attached drawings.

FIG. 1 is an exploded perspective view of a reinforcing bar coupler, according to an embodiment of the present invention, FIG. 2 is a sectional view to show reinforcing bars coupled by the reinforcing bar coupler of FIG. 1, and FIG. 3 is a perspective view to show specified parts of a reinforcing bar coupler, according to another embodiment of the present invention. FIG. 4 is an exploded perspective view of a conventional reinforcing bar coupler, and FIG. 5 is a sectional view to show reinforcing bars coupled by the coupler of FIG. 4.

As shown in the drawings, a reinforcing bar coupler 1

according to this invention includes a cover unit 10 to surround the joint of the reinforcing bars, and a locking bushing 20 to compress the cover unit 10 against reinforcing bars 30.

The cover unit 10 includes at least two pieces 10a and 10b that are joined together to define a circular hole therein. In this case, outer surfaces of the pieces 10a and 10b are inclined in the same direction, thus forming a tapered surface 16.

According to this embodiment, the cover unit 10 includes a pair of pieces 10a and 10b each having a semi-circular cross-section. The pieces 10a and 10b having semi-circular cross-sections are inclined in the same direction, and come into contact with each other while surrounding the reinforcing bars. Thereby, the cover unit 10 provides a cylindrical structure which is tapered toward one end thereof.

On an inner surface of the cover unit 10 are provided annular grooves 12 so that annular ribs 32 of the reinforcing bars 30 are seated in the annular grooves 12. In this embodiment, the annular grooves 12 are continuously provided, at regular intervals, on the inner surface of each of the pieces 10a and 10b which constitute the cover unit 10. In this case, an interval between neighboring annular grooves 12 corresponds to an interval between neighboring annular ribs 32 of the reinforcing bars 30.

The locking bushing 20 has the shape of a pipe into which the cover unit 10 is inserted. An inner surface of the locking bushing 20 forms a tapered surface 22 to correspond to the tapered surface 16 defining the outer surface of the cover unit 10. In this case, an inner diameter of the locking bushing 20 is determined to be able to receive the cover unit 10 therein and allow the inner surface of the locking bushing 20 to be in close contact with the tapered surface 16 of the cover unit 10.

According to the embodiment, the locking bushing 20 has the shape of the hollow pipe, the hollow pipe having a circular cross-section and being tapered toward one end thereof to form a tapered surface on an inner surface of the pipe. Further, the locking bushing 20 having the shape of the pipe may comprise a pair of locking bushings, and the pair of locking bushings is located on both ends of the cover unit. When mounting the locking bushings on both ends of the cover unit, the locking bushings are fitted over the cover unit 10 in a direction from a smaller-diameter part to a larger-diameter part of the cover unit 10.

The operation of the present invention constructed as described above will be described with reference to the embodiments shown in the attached drawings.

First, the cover unit 10, having the pair of pieces 10a and 10b with the semi-circular cross-section, is placed to cover the reinforcing bars 30. At this time, the annular

ribs 32 of the reinforcing bars 30 are seated in the annular grooves 12 of the pieces 10a and 10b.

Subsequently, the cover unit 10, placed to cover the reinforcing bars 30, is firmly coupled to the reinforcing bars by the locking bushing 20 having the shape of a hollow pipe. In this case, the locking bushing 20 is fitted over the cover unit 10. In order to increase coupling force between the components, the locking bushing 20 is struck. As the locking bushing 20 is struck, the locking bushing 20 strongly compresses the cover unit 10 against the reinforcing bars 30. At this time, the tapered surface 22 provided on the inner surface of the locking bushing 20 is compressed against the tapered surface 16 provided on the outer surface of the cover unit 10. Thus, strong coupling of the locking bushing 20 with the cover unit 10 is maintained, thus preventing the locking bushing from being undesirably removed from the cover unit 10.

When the cover unit 10 is compressed against the reinforcing bars 30 by the locking bushing 20, the annular ribs 32 of the reinforcing bars 30 are seated in the annular grooves 12 of the cover unit 10, so that the ends of the two reinforcing bars are firmly coupled to each other. According to the present invention, the number of locking bushings may be one, two, three or more. When the locking bushing comprises a single cylinder, the cylinder has an enough length to cover the whole cover unit.

Meanwhile, when the locking bushing comprises two cylinders, two cylinders are placed on both ends of the cover unit. Further, when the locking bushing comprises three cylinders, it is preferable that the cylinders be placed on a center and both ends of the cover unit. When the locking bushing comprises two or more cylinders, each cylinder may have a short length, so that the locking bushing may have the shape of a ring. In the present invention, inclination angles of the tapered surface of the cover unit and the tapered surface of the locking bushing are important. When the angle of each of the tapered surfaces is large, the locking bushing may be easily removed from the cover unit. Conversely, when the angle of each of the tapered surfaces is small, the locking bushing may not be easily removed from the cover unit, but a longer time may be required to fit the locking bushing over the cover unit. When collectively considering all factors, including fastening force, it is most preferable that the angle be 1° to 3° .

FIG. 3 shows a reinforcing bar coupler, according to another embodiment of the present invention. According to this embodiment, lateral grooves 14 are provided on an inner surface of the cover unit 10 so that lateral ribs 34 of the reinforcing bars 30 are seated in the lateral grooves 14.

Thus, when arranging the cover unit 10, the cover

unit 10 is seated on the reinforcing bars 30 so that the lateral ribs 34 of the reinforcing bars 30 are inserted into the lateral grooves 14 of the cover unit 10. Such a construction allows the reinforcing bar coupler of this invention including the cover unit 10 to be coupled to the reinforcing bars 30 at various angles.